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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,899	08/20/2003	Shuichi Takeuchi	P23758	4641
7055 7590 05/09/2007 GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191			EXAMINER DANIELSEN, NATHAN ANDREW	
			ART UNIT 2627	PAPER NUMBER
			NOTIFICATION DATE 05/09/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/643,899

Applicant(s)

TAKEUCHI, SHUICHI

Examiner

Nathan Danielsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 9-13 and 23-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 9-13, 23-26, 28 and 29 is/are rejected.
- 7) ☒ Claim(s) 5 and 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. Claims 1-6, 9-13, and 23-29 are pending. Claims 7, 8, and 14-22 were canceled and claims 23-29 were added in Applicant's amendment filed 20 April 2007.

Response to Amendment

2. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 6, 9, 23, 28, and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimozono (US Patent 6,556,534).

Regarding claims 1 and 23, Shimozono discloses an optical system for an optical disc drive (figure 4), comprising:

a light source that emits first and second light beams, said first and second light beams utilized for recording and/or reproducing data to/from first and second optical discs, respectively, the second optical disc having a thicker protective layer and lower recording density than the first optical disc (figure 4 and col. 1, lines 56-62);

an objective lens provided with a diffraction structure, said diffraction structure being designed to focus said first light beam on a recording layer of the first optical disc and said second light beam on a recording layer of the second optical disc (figure 4); and

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a collimator lens disposed between said light source and said objective lens to adjust diverging/converging angle of said first and second light beams entering said objective lens (figure 4 where the angle of the light entering the collimator lens is different than the angle of the light leaving the lens), wherein change in spherical aberration of said first light beam caused by wavelength deviation from a design wavelength due to individual specificity of said light source is corrected by adjusting the diverging/converging angle of said first light beam emerging from said collimator lens (suggested by col. 7, lines 16-34), and wherein the collimator lens is fixed at a predetermined location during assembly of the optical system (col. 9, lines 56-62).

Further regarding claim 1, Shimozono discloses where:

said collimator lens is located between first and second optimum positions, the spherical aberration of said first light beam converged onto the recording layer of the first optical disc being minimized when said collimator lens is located at said first optimum position, the spherical aberration of said second light beam converged onto the recording layer of the second optical disc being minimized when said collimator lens is located at said second optimum position (suggested by the combination of col. 7, lines 16-34 and col. 9, lines 56-62).

Further regarding claim 23, Shimozono disclose where:

the diverging/converging angle of said first light beam is adjusted so as to minimize spherical aberration of said first light converged onto the recording layer of the first optical disc (suggested by the combination of col. 7, lines 16-34 and col. 9, lines 56-62).

Regarding claims 6 and 28, Shimozono discloses where said light source includes first and second light emitting elements for generating said first and second light beams, respectively, said first and second light emitting elements being integrally formed (figure 4).

Regarding claims 9 and 29, Shimozono disclose where said objective lens has a numerical aperture for said first light beam not less than 0.63 (col. 11, lines 18-47).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimozono, in view of Ikenaka et al (US Patent 6,728,172; hereinafter Ikenaka).

Regarding claims 2 and 24, Shimozono discloses everything claimed, as applied to claims 1 and 23, respectively. However, Shimozono fails to disclose how to use the temperature variations of an objective lens to compensate for the spherical aberration generated due to wavelength variations in the light source.

In the same field of endeavor, Ikenaka discloses where said diffraction structure is designed so that change in spherical aberration caused by wavelength variations of said first and second light beams due to temperature variation of said light source compensate for change in spherical aberration caused by temperature variation of said objective lens (figure 2 and col. 4, line 63 through col. 5, line 22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the temperature variations of an objective lens to compensate for the spherical aberration generated due to wavelength variations in the light source, as taught by Ikenaka, for the purpose of recording\reproducing information to\from optical information recording media having different recording densities (col. 1, lines 57-62).

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7. Claims 3, 4, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimozono, in view of Nishiwaki et al (US Patent Application Publication 2003/0072246; hereinafter Nishiwaki).

Regarding claims 3 and 25, Shimozono discloses everything claimed, as applied to claims 1 and 23, respectively. However, Shimozono fails to disclose where said diffraction structure is designed so that change in spherical aberration caused by said objective lens in accordance with wavelength variation of said first light beam is generated substantially only by third-order spherical aberration.

In the same field of endeavor, Nishiwaki discloses where said diffraction structure is designed so that change in spherical aberration caused by said objective lens in accordance with wavelength variation of said first light beam is generated substantially only by third-order spherical aberration (§§ 10 and 97).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have designed a diffraction structure to change the third-order spherical aberration of the light passing there through, as taught by Nishiwaki, for the purpose of realizing excellent signal recording and reproduction for optical disks with different substrate thicknesses (§ 13).

Regarding claims 4 and 26, Shimozono, in view of Nishiwaki, discloses everything claimed, as applied to claims 3 and 25, respectively. However, Shimozono fails to disclose where the diffraction structure is designed so that change in fifth or higher order component of the spherical aberration caused by said objective lens in accordance with wavelength variation of said first light beam is less than one fifth of the third-order component thereof.

In the same field of endeavor, Nishiwaki discloses where the diffraction structure is designed so that change in fifth or higher order component of the spherical aberration caused by said objective lens in accordance with wavelength variation of said first light beam is less than one fifth of the third-order component thereof (§§ 10 and 97 where the initial third-order spherical aberration is approximately $160\text{ m}\lambda$ and the remaining (primarily fifth- and higher-order) spherical aberration is approximately $28\text{ m}\lambda$, or approximately 18% of the third-order spherical aberration and approximately 15% of the total spherical aberration).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have designed a diffraction structure such that the fifth- and higher-order spherical aberration was less than one fifth the third-order spherical aberration, as taught by Nishiwaki, for the purpose of realizing excellent signal recording and reproduction for optical disks with different substrate thicknesses (§ 13).

8. Claims 10, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai et al (US Patent 6,671,247; hereinafter Arai), in view of Shimozono.

Regarding claim 10, Arai discloses an optical system for an optical disc drive, comprising:
first and second light sources emitting first and second light beams, respectively, said first and second light beams utilized for recording and/or reproducing data to to/from first and second optical discs, respectively, the second optical disc having a thicker protective layer and lower recording density than the first optical disc (col. 64, lines 20-45 and figure 1); and
an objective lens provided with a diffraction structure, said diffraction structure being designed to focus said first laser beam on a recording layer of the first optical disc and said second laser beam on a recording layer of the second optical disc (figure 9);
first and second collimator lenses (collimator lenses 21 and 22) disposed between said objective lens and said first and second light sources, respectively, so as to adjust diverging/converging angles of said first and second light beams entering said objective lens (col. 64, lines 20-45 and figure 1).

However, Arai fails to disclose the details of the positioning of each of the collimator lenses.

In the same field of endeavor, Shimozono discloses where:

said first and second collimator lenses are located so as to respectively correct change in spherical aberration of said first and second light beams caused by wavelength deviations from design wavelengths of said first and second light beams due to individual

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specificity of said first and second light sources (suggested by the combination of col. 7, lines 16-34 and col. 9, lines 56-62),

wherein the first collimator lens is located at a first optimum position so that the spherical aberration of said first light beam converged onto the recording layer of the first optical disc is minimized (suggested by the combination of col. 7, lines 16-34 and col. 9, lines 56-62),

wherein the second collimator lens is located at a second optimum position so that the spherical aberration of said second light beam converged onto the recording layer of the second optical disc is minimized (suggested by the combination of col. 7, lines 16-34 and col. 9, lines 56-62), and

wherein the first and second collimator lenses are fixed at the first and second optimum positions, respectively, during assembly of the optical system (suggested by col. 9, lines 56-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the positioning of the collimator lenses of Arai in the manner suggested by Shimozono, for the purpose of optimizing aberration in an optical system (col. 7, lines 16-34).

Regarding claim 11, Arai, in view of Shimozono, discloses everything claimed, as applied to claim 10. Additionally, Arai discloses an optical element disposed between said objective lens and said first and second collimator lenses, said optical element combining optical paths of said first and second light beams passed through said first and second collimator lenses (figure 1).

Regarding claim 13, Arai, in view of Shimozono, discloses everything claimed, as applied to claim 10. Additionally, Arai discloses where said objective lens has a numerical aperture not less than 0.63 for said first light beam (col. 64, lines 46-56).

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arai, in view of Shimozono, and further in view of Ikenaka.

Regarding claim 12, Arai, in view of Shimozono, discloses everything claimed, as applied to claim 10. However, Arai, in view of Shimozono, fails to disclose where said diffraction structure is designed so

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that change in spherical aberration caused by wavelength variations of said first and second light beams due to temperature variations of said first and second light sources compensate for change in spherical aberration caused by temperature variation of said objective lens.

In the same field of endeavor, Ikenaka discloses where said diffraction structure is designed so that change in spherical aberration caused by wavelength variations of said first and second light beams due to temperature variations of said first and second light sources compensate for change in spherical aberration caused by temperature variation of said objective lens (figure 2 and col. 4, line 63 through col. 5, line 22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the temperature variations of an objective lens to compensate for the spherical aberration generated due to wavelength variations in the light source, as taught by Ikenaka, for the purpose of recording\reproducing information to\from optical information recording media having different recording densities (col. 1, lines 57-62).

Citation of Relevant Prior Art

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
 - a. Kitaoka et al (US Patent 6,819,646) disclose the optimization of aberration in an optical system having a single collimator lens by adjusting the position of the semiconductor lasers;
 - b. Ikenaka et al (US Patent Application Publication 2003/0076595) disclose an objective lens having a diffraction structure designed such that aberration is under-corrected for one wavelength and either optimized or over corrected for another wavelength; and
 - c. Ogata et al (US Patent Application Publication 2003/0214898) disclose the adjustment of a collimator lens for correction of chromatic aberration of a single light source.

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Allowable Subject Matter

11. Claims 5 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Claims 5 and 27 are allowable over the prior art of record because all references, considered as closest prior art and viewed individually or in combination, fail to teach or fairly suggest a "diffraction structure designed so that change in fifth or higher order component of the spherical aberration caused by said objective lens in accordance with wavelength variation of said first light beam is less than $0.0005 \lambda_{rms}/nm$ ".

Response to Arguments

13. Applicant's arguments, see pages 10-20, filed 20 April 2007, with respect to the rejection(s) of claim(s) 1, 7, 8, and 10 under 35 U.S.C. § 103(a) utilizing US Patent Application Publication 2002/0181353 to Katayama have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of various combinations Shimozono, Arai, Ikenaka, and Nishiwaki. All other arguments presented are moot in view of the new grounds of rejection.

Closing Remarks/Comments

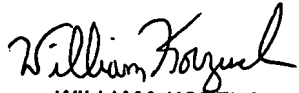
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Danielsen whose telephone number is (571) 272-4248. The examiner can normally be reached on Monday-Friday, 9:00 AM - 5:00 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nathan Danielsen
05/01/2007


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